AP Computer Science
APCircle Project

Name _____

Date _____ Period _____

APCircle Project

Your task is to (using BlueJ) create the `APCircle` class that you will write from scratch as specified below. To get started, first download, extract, and save the APCircle project to your computer. The download link is located on the assignment web page for this project. Once you have saved the files to your computer, then click on the BlueJ package icon in the project directory, and BlueJ will open up the project for you. You can see that there is a tester class (called `APCircleTest`) that you can run anytime you want and it will show you the status of your work so far.

If you are not sure how to proceed, have a look at the `Clock` class we did together in class a few days ago. The `APCircle` class will follow much of the same protocols.

Now, please turn the page, and complete the assignment as directed.

An `APCircle` object represents a circle, which is defined as a collection of points equidistant (r units) around a center point at coordinates (h, k), where (in this particular case) h, k, and r are all integers. The *area* of an `APCircle` is defined to be the `double` value πr^2. A point (represented by integers x and y) is on an `APCircle` if the equation $(x - h)^2 + (y - k)^2 = r^2$. Examples of two `APCircle` equations are shown in the following table.

Values	**Area (πr^2) (see note below)**	**Is point (1, 2) on the APCircle?**
$h = 0, k = 0, r = 5$	$\pi * 25 \approx 78.54$	No, because $(1 - 0)^2 + (2 - 0)^2 \neq 5^2$
$h = -3, k = 2, r = 4$	$\pi * 16 \approx 50.27$	Yes, because $(1 + 3)^2 + (2 - 2)^2 = 4^2$

(Note that for calculation purposes, π can be approximated as 3.1416, or you may use Math.PI instead.)

Assume that the following code segment appears in a class other than `APCircle`. The code segment shows an example of using the `APCircle` class to represent the two equations shown in the table.

```
APCircle c0 = new APCircle(0, 0, 5);
double area0 = c0.getArea(); // area0 is assigned 78.54 (approximately)
boolean onCircle0 = c0.isOnCircle(1, 2); // false because 1^2 + 2^2 ≠ 5^2

APCircle c1 = new APCircle(-3, 2, 4);
double area1 = c1.getArea(); // area1 is assigned 50.27 (approximately)
boolean onCircle1 = c1.isOnCircle(1, 2); // true because 4^2 + 0^2 = 4^2
```

Write the `APCircle` class. Your implementation must include a constructor that has three integer parameters that represent h, k, and r, in that order. It must also include a method `getArea` that calculates and returns the area of the APCircle, and a method `isOnCircle` that returns `true` if the point represented by its two parameters (`x` and `y`, in that order) is on the `APCircle` and returns `false` otherwise. Your class must produce the indicated results when invoked by the code segment given above.

You will know when you have completed this assignment when you run the tester and receive a congratulatory message. When you are done, please run the tester for me to see so that I will know you have finished this assignment.